

THAT WHICH IS CLAIMED IS:

1. An integrated circuit device, comprising:
  - a search engine that is configured to support a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:
    - a first search key that requires at least one data cycle to load into said search engine before a first search of a first one of the plurality of databases is performed using a first search word derived from the first search key; and
    - a second search key that comprises a replacement search key segment and at least one search key segment from the first search key.
2. The device of Claim 1, wherein the plurality of consecutive search operations comprises a second search of a second one of the plurality of databases using a second search word derived from the second search key.
3. The device of Claim 2, wherein the second search key is shorter than the first search key.
4. The device of Claim 2, wherein none of the plurality of search keys is longer than the first search key.
5. The device of Claim 2, wherein the replacement search key segment requires one data cycle to load into said search engine.

6. The device of Claim 5, wherein the plurality of search keys comprise a third search key that comprises another replacement search key segment and at least one search key segment from the first search key; wherein the another replacement search key segment requires one data cycle to load into said search engine; and wherein the another replacement search key segment is loaded into said search engine after the replacement search key segment is loaded into said search engine.

7. The device of Claim 6, wherein the replacement search key segment and the another replacement search key segment have equivalent values.

8. The device of Claim 7, wherein the plurality of consecutive search operations comprises a third search of a third one of the plurality of databases using a third search word derived from the third search key; and wherein the second and third search words are different.

9. The device of Claim 2, wherein the replacement search key segment requires fewer than the multiple data cycles to load into said search engine.

10. An integrated circuit device, comprising:

a search engine that is configured to support a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:

a first search key that requires at least one data cycle to load into said search engine before a search of a first of the plurality of databases is performed using a search word that is derived from the first search key; and

a second search key that comprises at least one search key segment from the first search key and another search key segment that is loaded into said search engine after the first search key.

11. The device of Claim 10, wherein the plurality of consecutive search operations comprises a second search of a second one of the plurality of databases using a second search word derived from the second search key.

12. The device of Claim 11, wherein the second search key is longer than the first search key.

13. The device of Claim 11, wherein the another search key segment requires one data cycle to load into said search engine.

14. An integrated circuit device, comprising:

a search engine that is configured to support a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core, using a corresponding plurality of search keys that include a longest first search key that requires multiple cycles to load into said search engine before a search of a first of the plurality of databases is performed and at least one shortest search key that requires fewer than the multiple cycles to load into said search engine and comprises a replacement search key segment and at least one search key segment from the first search key.

15. An integrated circuit device, comprising:

a search engine that is configured to support a plurality of consecutive search operations in a corresponding plurality of databases within an internal CAM core using a corresponding plurality of search keys, said plurality of search keys comprising:

a first search key that requires multiple data cycles to load into said search engine before a first search of a first one of the plurality of databases is performed;

a second search key that comprises a first replacement search key segment and at least a first search key segment from the first search key; and

a third search key that comprises a second replacement search key segment and at least a second search key segment from the first search key.

16. The device of Claim 15, wherein the first search key segment from the first search key and the second search key segment from the first search key are equivalent search key segments.

17. The device of Claim 15, wherein the first replacement search key segment requires only one data cycle to load into said search engine.

18. The device of Claim 17, wherein the second replacement search key segment is loaded into said search engine after the first replacement search key is loaded into said search engine.

19. An integrated circuit device, comprising:  
a search engine chip that is configured to respond to a single multi-database search instruction and an encoded multi-database identifier by performing as many as  $N$  consecutive search operations in a corresponding number of different databases within an internal CAM core using a corresponding number of search words, where  $N$  is a positive integer greater than one.

20. The device of Claim 19, wherein said search engine chip is configured to interpret locations of active bits within the encoded multi-database identifier as specifying the identities of a plurality of databases to be searched in response to the single multi-database search instruction.

21. The device of Claim 19, wherein  $N$  is greater than three; and wherein a length of the encoded multi-database identifier equals  $N_d$  bits, where  $N_d$  is a positive integer that equals a maximum number of databases within the internal CAM core.

22. An integrated circuit device, comprising:  
a search engine chip that is configured to respond to a single multi-database search instruction and an encoded global mask identifier by performing as many as  $N$  consecutive search operations within an internal CAM core using a corresponding number of different search words that are

derived from a common search key but differ by the value of their respective global masks, where  $N$  is a positive integer greater than one.

23. The device of Claim 22, wherein said search engine chip is configured to interpret locations of active bits within the encoded global mask identifier as specifying the identities of a plurality of global masks to be applied to the common search key when generating the different search words.

24. An integrated circuit device, comprising:

a search engine chip that is configured to respond to a single multi-database search instruction and an encoded multi-database identifier by performing  $N$  consecutive search operations in  $N$  different databases within an internal CAM core using  $N$  different search words, where  $N$  is a positive integer greater than two; and wherein a length of the encoded multi-database identifier is less than  $(N-1) \times \log_2 N_d$  bits, where  $N_d$  is a positive integer that equals a maximum number of databases within the internal CAM core.

25. The device of Claim 24, wherein the length of the encoded multi-database identifier is  $N_d$  bits.